Claims

1.   A method for determining motion vectors for encoding picture data in a sequence of pictures wherein data representing a picture in the sequence is arranged in a plurality of 5 adjacent data blocks, the method comprising the steps of:

(a)   encoding a first picture in the sequence with motion vectors for the data blocks in the first picture;

(b)   generating respective local motion vectors for groups of adjacent data blocks in the first picture, wherein a local motion vector for each group of data blocks is generated 10 according to the individual motion vectors of the data blocks in the group;

(c)   selecting a data block of an object picture to be coded;

(d)   determining a window of search data from a reference picture on the basis of the corresponding position of the selected data block and the local motion vector which corresponds to the selected data block; and

15   (e)   comparing the selected data block with the search data from the reference picture in order to determine a motion vector for the selected data block.

2.   A method as claimed in claim 1, including repeating the steps (c), (d) and (e) for each data block in a group of adjacent data blocks in the object picture.

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3.   A method as claimed in claim 2, including a step (f) of generating a local motion vector from the motion vectors of the data blocks in said group of data blocks in the object picture.

25 4.   A method as claimed in claim 1, 2 or 3, wherein each said group of adjacent data blocks comprises a row of macroblocks from the respective picture.

5.   A method as claimed in claim 2, wherein the window of search data is of fixed size for a group of data blocks.

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6.   A method as claimed in claim 5, wherein the step (e) involves storing the window of search data in a cache memory, and wherein each successive iteration of the step (e) after an initial operation requires only a fraction of the size of the search data window to be cached.

5   7.   A method as claimed in claim 3, including repeating the steps (c) through (f) for each data block and group of data blocks in the object picture.

8.   A method as claimed in claim 7, including a step (g) of determining a maximum offset vector based on the maximum of absolute values of horizontal and vertical components of the

10   local motion vectors for the object picture, and selecting a variable length coding table for coding the data block motion vectors for the object picture based on the maximum offset vector.

9.   A method as claimed in claim 7, wherein the local motion vectors generated from the

15   object picture are subsequently used for performing step (d) during coding of a successive picture in the sequence of pictures.

10.   A method as claimed in claim 1, 2, 3 or 4, wherein the local motion vector for a group of data blocks comprises an average of the motion vectors for the data blocks in the

20   group.

SuSan   11.   A method as claimed in claim 1, 2, 3 or 4, wherein the local motion vector for a group of data blocks comprises a median of the motion vectors for the data blocks in the group.

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SuSan   12.   A method as claimed in claim 1, 2, 3 or 4, wherein the local motion vector for a group of data blocks comprises a most common value of the motion vectors for the data blocks in the group.

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13.   A moving pictures encoder for encoding a sequence of pictures, including: a motion vector detector coupled to receive picture data from the sequence of pictures for determining respective motion vectors for data blocks in a picture of the picture sequence, wherein each motion vector is determined using a comparison of the data block with search window data from a reference picture; a local motion estimator coupled to the motion vector detector for determining and storing a local motion vector based on motion vectors from a group of adjacent data blocks from a picture; and wherein the motion vector detector utilises stored local motion vectors from a previously coded picture to determine the search window data.

14.   A moving pictures encoder as claimed in claim 13, wherein the reference picture is stored in a frame buffer memory the search window data in a search window cache memory, and wherein the motion vector detector is coupled to control transfer of data from the frame buffer memory to the search window cache memory on the basis of stored local motion vectors.

15.   A moving pictures encoder as claimed in claim 14, wherein a group of adjacent data blocks utilised by the local motion estimator to determine a local motion vector comprises a row of macroblocks from a picture.

16.   A moving pictures encoder as claimed in claim 13, further including a transform coder and a statistical coder which uses variable length code tables for encoding the motion vectors, and a maximum vector analyser for determining a maximum vector magnitude from the local motion vectors for a picture and selecting a variable length coding table for use by the statistical coder on the basis of the maximum vector magnitude.

17.   A coding apparatus for encoding picture data in a sequence of pictures wherein data representing a picture in the sequence is arranged in a plurality of adjacent data blocks and motion vectors are generated for the data blocks of a picture in the sequence, the coding apparatus including:

        a local motion estimator for generating respective local motion vectors for groups of

adjacent data blocks in the object picture, wherein a local motion vector for each group of data blocks is generated according to individual motion vectors of the data blocks in the group;

a local motion vector storage memory for storing the local motion vectors for the
5 object picture; and

a motion vector detector for generating motion vectors for data blocks in an object picture, the motion vector detector including a search window cache for caching a selected portion of a reference picture and a search engine for comparing data blocks of the object picture with the search window cache contents, wherein the contents of the search window
10 cache are selected according to a local motion vector retrieved from the local motion vector storage memory from a previously coded picture in the picture sequence.

18.   A coding apparatus as claimed in claim 17, wherein the local motion estimator generates a local motion vector for each row of macroblocks in a picture.

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$So Saz$ 19.   A coding apparatus as claimed in claim 17, further including a transform coder and a statistical coder which uses variable length code tables for encoding the motion vectors, and a maximum vector analyser for determining a maximum vector magnitude from the local motion vectors for a picture and selecting a variable length coding table for use by the
20 statistical coder on the basis of the maximum vector magnitude.